

carrying exposed conductors at a pressure over 650 volts shall be screened off and accessible only to authorized persons.

All power-house and sub-station switchboards shall be provided with two efficient and independent earth connections connected in parallel, to one of which all frames, instrument-cases, and other metal parts shall be connected. Means shall be provided for testing the resistance between these two connections through the earth. Such tests shall be made at least once a month and recorded.

*Circuit-breakers.*

19. All outgoing feeders and distributors from any generating station or substation shall be provided with automatic circuit-breakers or fuses set to open at 100 per cent. excess current over the rated full load of such feeder or distributor, with a time-limit not exceeding ten seconds.

*Distribution.*

20. The distribution shall be carried out on the two or three-wire system, and may be either by underground or overhead conductors; provided that if at any time it is deemed by the Minister to be detrimental to the public safety for the conductors or any particular class of conductors to be overhead, such conductors shall, on receipt of notification to that effect from the Minister, and within ten months of such notification, be laid underground, and all consequent and necessary alterations made by and at the cost of the Council. The earth shall not be used in place of a return wire.

*Overhead Electric Lines.*

21. The diameter of any conductor or any electric line laid or erected for the supply of electrical energy shall not be less than 0.104 inches diameter (No. 12 S.W.G.). If the material of the conductor is aluminium the conductor shall be stranded.

Where an aerial wire crosses a street the angle between the line and the direction of the street at the place of crossing shall not be less than 60 degrees, and the spans shall be as short as possible.

The stress in overhead conductors shall not exceed 25,000 lb. per square inch for copper, 12,000 lb. per square inch for aluminium, 34,000 lb. per square inch for steel, and 22,500 lb. per square inch for iron in the extreme case of a temperature of 32° Fahr. and a wind-pressure of 18 lb. per square foot of diametrical plane occurring simultaneously. The span between supports and the sag shall be determined to conform with the above limiting stresses.

No overhead low-pressure electric lines shall come within 3 ft. of any other aerial wires or cables except where it may be permitted to pass either set of wires between other wires at a pole or support.

Electric lines at low pressure shall be insulated throughout with triple braiding impregnated with waterproof compound, provided that where circumstances permit the lines may, with the consent of the Minister, be bare.

Electric lines at high pressure shall be covered with vulcanized rubber at least 600-megohm grade, provided that where circumstances permit the lines may, with the consent of the Minister, be bare.

Electric lines at extra high pressure shall be bare.

High-pressure and extra-high-pressure lines shall not be carried on the same poles or supports, except in special circumstances and with the consent of the Minister.

Low-pressure and extra-high-pressure lines shall not be carried on the same poles or supports, except in special circumstances and with the consent of the Minister.

All overhead electric lines at low pressure shall be carried at a minimum height of 18 ft. above the ground.

All overhead lines at high pressure shall be carried at a minimum height of 20 ft. above the ground.

All overhead lines at extra high pressure shall be carried at a minimum height of 23 ft. above the ground.

*Telephone Wires on Transmission-line Poles.*

22. The telephone wire or wires shall be of hard-drawn copper, and shall not be less than No. 14 standard wire gauge. The minimum clearance between the lowest point of the span and the ground shall be 18 ft.

The wire shall be suitably guarded against lightning, and shall be fused. Such arrangements shall be made where the telephone is placed as will prevent the possibility of injury resulting to any person using the telephone should a power-wire come into contact with the telephone wire or from leakage or from induction.

*Supports for Overhead Lines.*

23. All aerial wires shall be attached to suitable insulators, carried on cross-arms or brackets of suitable material and cross-section, and they shall be so attached to the insulators

or guarded that they cannot fall away from the support. Conductors covered with insulating material shall be so attached that their insulation shall not be impaired where they are secured to the insulator.

Every support for an aerial line shall be of durable material and properly strengthened against forces due to wind-pressure, change of direction of line, and unequal length of span. The factor of safety of such supports outside borough limits shall be such that the moment resulting from a wind-pressure of 30 lb. per square foot and 18 lb. per square foot of diametrical plane upon a cylindrical surface upon the lines and supports shall not exceed one-half of the applied moment which is sufficient to cripple the support if of iron, steel, or ferro-concrete, and shall not exceed one-fourth of the breaking stress in the case of wood. The factor of safety of supports within the borough limits shall be four in the case of steel, iron, or ferro-concrete, and five in the case of wood, calculated upon the ultimate strength of material under the same conditions of wind-pressure as hereinbefore mentioned.

The distance between supports where bare conductors are allowed may exceed 200 ft., provided conductor used is not less than 0.0229 square inch section, but no spans within borough limits shall exceed 200 ft. except by approval of the Minister.

*Location of Overhead Lines.*

24. Except by permission of the Minister of Telegraphs, or subject to an agreement between the Post and Telegraph Department and the Council, all overhead electric lines shall be placed on the opposite side of the street to that on which any telegraph lines exist; and where the erection of the electric lines necessitates the alteration of any telegraph lines, and such alteration is approved by the Minister of Telegraphs, the cost of the alteration shall be borne by the Council.

In running the lines authorized by this license through or along any street where no telegraph line exists the Council shall keep to one side of the street, and in running wires to the opposite side of the street the Council shall arrange so as to interfere as little as possible with the route on that side of any future telegraph lines.

*Lines not in Use.*

25. An aerial line shall not be permitted to remain erected after it has ceased to be used for the supply of energy unless the Council intends within a reasonable time again to take it into use.

*Post and Telegraph.*

26. Where electric lines are permitted to be supported on telegraph poles all details of the supports and of the insulation shall be approved by the Minister of Telegraphs, who may, on giving to the Council reasonable notice in that behalf, require the Council to remove such electric lines at any time from such telegraph poles, and without payment of any compensation to the Council; provided that where a special agreement is come to for the erection and maintenance of a joint line of poles, the use of such joint line shall be subject only to such conditions as may be specified in the special agreement aforesaid.

At telegraph crossings the electric lines shall pass over or under the telegraph wires or cables as may be decided by the Minister of Telegraphs, and shall be at least 2 ft. distant. Where it is impracticable to cross above or below, the electric lines may be taken through, but when permitted to be taken through the crossing shall be made at a pole in a manner to be approved by the Minister of Telegraphs.

Where the electric lines intersect telegraph lines the latter shall be suitably insulated if deemed necessary, and when the crossing is above and near a pole the spans on each side of the pole may be insulated. This insulation shall be effected at the expense of the Council in cases where the telegraph lines existed previously to the erection of the electric lines.

Where high-pressure electric lines intersect telegraph lines, the former shall be insulated with not less than 600-megohms grade of vulcanized rubber, and the low-pressure wires with weatherproofed insulation as prescribed in clause 21.

Where deemed necessary efficient guard-wires, effectively earthed, or other approved protective devices, shall be erected in a manner to meet with the approval of the Minister of Telegraphs at all crossings or places where electric lines intersect telegraph lines, or at any place where such protection may be considered necessary.

The Council shall bear the expense of such guard-wires or other devices in all cases where an electric line intersects any telegraph line previously existing.

Where overhead electric lines at extra high pressure cross telegraph lines, the electric lines shall be subject to special conditions as may be required by the Minister of Telegraphs in each case of such crossing.